

PATENT ABSTRACTS OF JAPAN

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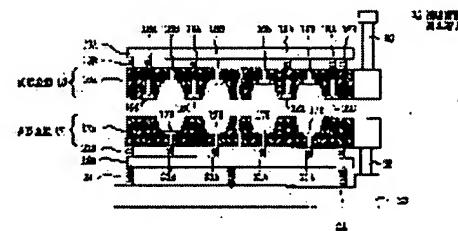
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(54) PHOTOELECTRIC CONVERTER AND PRODUCTION THEREOF

(57) Abstract:

PURPOSE: To improve releasing of mold by employing a first molding die having matte finish molding face fixed with a mirror finish mold component while opposing a photoelectric conversion element and an entirely matte finished second molding die.

CONSTITUTION: When a photoelectric converter is produced by sealing a photoelectric conversion element with a transparent resin, a first molding die 16 having matte finish molding face fixed with a mirror finish mold component 16B while opposing the photoelectric conversion element and an entirely matte finished second molding die 17 are employed. Consequently, a photoelectric converter where only the surface part facing the photoelectric conversion element is mirror finished and the remaining surface part is matte finished can be obtained. This method improves releasing of metal molds 16, 17.



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CLAIMS

[Claim(s)]

[Claim 1] In the manufacture approach of photo-electric-conversion equipment of coming to carry out the closure of the optoelectric transducer by transparency resin The 1st shaping metal mold of the mold face crepe which comes to attach the metal mold components by which mirror plane finishing was carried out in the mold face part which meets the above-mentioned optoelectric transducer at the time of manufacture of the above-mentioned photo-electric-conversion equipment, The manufacture approach of the photo-electric-conversion equipment characterized by injecting transparency resin into the clearance parts of a mold clamp meal, the above 1st by which it was mold clamp carried out mutually, and the 2nd shaping metal mold where the above-mentioned optoelectric transducer is pinched for the 2nd shaping metal mold of mold face crepe from both sides.

[Claim 2] The above-mentioned metal mold components are the manufacture approaches of the photo-electric-conversion equipment according to claim 1 characterized by being attached free [sliding] to the shaping metal mold of the above 1st, projecting from the shaping metal mold of the above 1st in case the above-mentioned photo-electric-conversion equipment therefore fabricated by the above 1st and the 2nd shaping metal mold is removed from a mold face, and making the above-mentioned photo-electric-conversion equipment separate from a mold face.

[Claim 3] The mold face of the above-mentioned metal mold components is the manufacture approach of the photo-electric-conversion equipment according to claim 1 or 2 characterized by curving in the concave surface configuration.

[Claim 4] Luminescence equipment characterized by preparing the luminescence side of the above-mentioned light emitting device, and the convex lens with which the front face was formed in the mirror plane at the part which counters in the transparency resin package of the above-mentioned light emitting device with which a light emitting device is therefore really formed in shaping in the luminescence equipment which therefore comes to carry out the closure to transparency resin.

[Claim 5] Light-receiving equipment characterized by preparing the convex lens with which the front face was formed in the mirror plane in the part which counters the transparency resin package of the above-mentioned photo detector with which a photo detector is therefore really formed in shaping in the light-receiving equipment which therefore comes to carry out the closure to transparency resin with light-receiving Men of the above-mentioned photo detector.

[Claim 6] In the manufacture approach of photo-electric-conversion equipment of coming to carry out the closure of the optoelectric transducer by transparency resin The 1st shaping metal mold of the mold face crepe which comes to attach the metal mold components by which mirror plane finishing was carried out in the mold face part which meets the above-mentioned optoelectric transducer at the time of manufacture of the above-mentioned photo-electric-conversion equipment, Where the above-mentioned optoelectric transducer is pinched from both sides, the 2nd shaping metal mold of mold face crepe A mold clamp meal, Inject transparency resin into the clearance parts of the above 1st by which it was mold clamp carried out mutually, and the 2nd shaping metal mold, and the above-mentioned optoelectric transducer is closed by the transparency resin

concerned. The manufacture approach of the photo-electric-conversion equipment characterized by preparing the light filter which makes the hollow part of the transparency resin package therefore formed in the above-mentioned metal mold components among the mold goods picked out from the above 1st and the 2nd shaping metal mold penetrate only the light of a predetermined band.

[Claim 7] Luminescence equipment characterized by preparing the luminescence side of the above-mentioned light emitting device, and the light filter which was formed in the part which counters, and which it becomes [light filter] depressed and makes a part penetrate only the light of a predetermined band in the transparency resin package of the above-mentioned light emitting device with which a light emitting device is therefore really formed in shaping in the luminescence equipment which therefore comes to carry out the closure to transparency resin.

[Claim 8] Light-receiving equipment characterized by preparing the light filter which was formed in the part which counters the transparency resin package of the above-mentioned photo detector with which a photo detector is therefore really formed in shaping in the light-receiving equipment which therefore comes to carry out the closure to transparency resin with light-receiving Men of the above-mentioned photo detector, and which it becomes [light filter] depressed and makes a part penetrate only the light of a predetermined band.

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Table of Contents] This invention is explained in order of the following.

The technique of the Field of the Invention former (drawing 8)

Technical-problem The means for solving a technical problem which invention tends to solve (drawing 1 - drawing 7)

Operation example (drawing 1 - drawing 7)

(1) The 1st example (drawing 1 - drawing 4)

(1-1) Photo-electric-conversion equipment (drawing 1)

(1-2) Manufacturing installation (drawing 2 - drawing 4)

(2) Other examples (drawing 5)

Effect of the invention [0002]

[Industrial Application] This invention is applied to what is used for the optical pickup section of a compact disk regenerative apparatus, concerning photo-electric-conversion equipment and its manufacture approach, and is suitable. Moreover, it applies to the manufacture approach and is suitable.

[0003]

[Description of the Prior Art] Optoelectric transducers, such as light emitting diode and a photodiode, are used in many fields including the optical pickup section today. For example, it is used also as the light source for automatic focuses, or an exposure meter of a camera. These optoelectric transducers are contained in the package of various quality of the materials or a configuration according to the application. Transparency resin is in one of the package ingredients of these. The photodiode for optical pickups described previously is one of the optoelectric transducers which use transparency resin as a package ingredient. The structure of this kind of photodiode 1 is shown in drawing 8.

[0004] The photo detector 2 which is the light sensing portion of this photodiode 1 is pasted up through the conductive epoxy resin on die pad 3A. Bonding pad 2A formed in the top face of a photo detector 2 is electrically connected through lead terminal 3B and the gold streak 4 which have been arranged around die pad 3A, respectively. It is the photodiode 1 which therefore closed this in the transparency package 5 which becomes with transparency plastic resin (an acid-anhydride system or phenol system).

[0005]

[Problem(s) to be Solved by the Invention] By the way, therefore, the light-receiving sensibility of this kind of photodiode 1 is influenced by the permeability of laser spot light or the scattered light which penetrates the transparency package 5 and reaches a photo detector 2. Then, generally the photodiode 17 is made as [carry out / mirror plane finishing of the package front face]. Thus, the metal mold which carried out mirror plane finishing of the whole surface of inner skin for processing a package front face on a mirror plane is used as shaping metal mold. However, there is a problem to which costs generally start processing this shaping metal mold in this way, and maintenance costs become high.

[0006] On the other hand, for the product manufactured with this shaping metal mold, a possibility that die releasing of shaping metal mold and a product may worsen in case the adhesion of shaping metal mold and a product is high, opens metal mold and removes a product, since the surface whole surface is finished in the shape of a mirror plane is *****. In addition, the product with which the whole surface was manufactured in the shape of a mirror plane in this way is easy to be recognized in case foreign matters by surroundings lump, such as HIKE therefore generated in the turbulent flow of the resin produced at the time of impregnation, and a void, dust, are visual inspection. For this reason, a possibility that it may be judged with a defective according to these defects produced to fields other than a light-receiving side without functional Kaminoseki charge is *****.

[0007] This invention was made in consideration of the above point, and tends to propose the good photo-electric-conversion equipment and its manufacture approach of die releasing to shaping metal mold.

[0008]

[Means for Solving the Problem] In order to solve this technical problem, it sets to this invention. In the manufacture approach of photo-electric-conversion equipment of coming to carry out the closure of the optoelectric transducer (2) by transparency resin The 1st shaping metal mold of the mold face crepe which comes to attach the metal mold components (16B) by which mirror plane finishing was carried out in the mold face part which meets an optoelectric transducer (2) at the time of manufacture of photo-electric-

conversion equipment (16), It is made to inject transparency resin into the clearance parts of a mold clamp meal, the 1st by which it was mold clamp carried out mutually and the 2nd shaping metal mold (16), and (17), where an optoelectric transducer is pinched for the 2nd shaping metal mold (17) of mold face crepe from both sides.

[0009] Moreover, in this invention, the luminescence side of a light emitting device and the convex lens (25A) with which the front face was formed in the mirror plane at the part which counters are prepared at the transparency resin package of a light emitting device with which a light emitting device is therefore really formed in shaping in the luminescence equipment which therefore comes to carry out the closure to transparency resin. The convex lens (25A) with which the front face was formed in the mirror plane is prepared in the part which counters the transparency resin package of a photo detector with which similarly a photo detector is therefore really formed in shaping in this invention in the light-receiving equipment which therefore comes to carry out the closure to transparency resin with light-receiving Men of a photo detector.

[0010] In the manufacture approach of photo-electric-conversion equipment of furthermore coming to carry out the closure of the optoelectric transducer (2) by transparency resin in this invention The 1st shaping metal mold of the mold face crepe which comes to attach the metal mold components (16B) by which mirror plane finishing was carried out in the mold face part which meets an optoelectric transducer (2) at the time of manufacture of photo-electric-conversion equipment (16), Where an optoelectric transducer (2) is pinched from both sides, the 2nd shaping metal mold (17) of mold face crepe A mold clamp meal, Inject transparency resin into the clearance parts of the 1st and the 2nd shaping metal mold (16), and (17) by which it was mold clamp carried out, and an optoelectric transducer (2) is closed by the transparency resin concerned. The light filter (26) which makes the hollow part of the transparency resin package therefore formed in metal mold components (16B) among the mold goods taken out from the 1st and the 2nd shaping metal mold (16), and (17) penetrate only the light of a predetermined band is prepared.

[0011] Moreover, in this invention, the light filter (26) which was formed in the luminescence side of a light emitting device and the part which counters and which it becomes [light filter] depressed and makes a part penetrate only the light of a predetermined band is prepared in the transparency resin package of a light emitting device with which a light emitting device is therefore really formed in shaping in the luminescence equipment which therefore comes to carry out the closure to transparency resin. The light filter (26) which was formed in the part which counters with light-receiving Men of a photo detector and which it becomes [light filter] depressed and makes a part penetrate only the light of a predetermined band is prepared in the transparency resin package of a photo detector with which similarly a photo detector is therefore really formed in shaping in this invention in the light-receiving equipment which therefore comes to carry out the closure to transparency resin.

[0012]

[Function] The 1st shaping metal mold (16) of the mold face crepe which comes to attach the metal mold components (16B) by which mirror plane finishing was carried out, and the 2nd shaping metal mold (17) of **** crepe are used for the mold face part which will meet an optoelectric transducer (2) as shaping metal mold at the time of manufacture of the photo-electric-conversion equipment formed by therefore closing an optoelectric

transducer (2) to transparency resin. Only an optoelectric transducer (2) and the surface part which counters are formed in a mirror plane by this, and other surface parts can obtain the photo-electric-conversion equipment formed in crepe. Consequently, die releasing from shaping metal mold (16) and (17) can improve. Moreover, even if HIKE etc. arises into parts other than an optical passage field among transparency packages, it cannot check from the outside because of crepe, but it can avoid judging it as a defective in the case of fine sight inspection. Consequently, the yield can be raised much more.

[0013] Moreover, if the convex lens with which the front face was formed in the mirror plane at the optoelectric transducer (2) and the part which counters at this time is formed in coincidence, photo-electric-conversion equipment with condensing high effectiveness can be obtained easily. Moreover, as compared with the former, thin photo-electric-conversion equipment with a light filter can be obtained by preparing the light filter which makes the hollow part produced in case a mirror plane is formed in an optoelectric transducer (2) and the part which counters penetrate only the light of a predetermined band.

[0014]

[Example] About a drawing, one example of this invention is explained in full detail below.

[0015] (1) In drawing 1 which attaches and shows the same sign to a corresponding point with the 1st example (1-1) photo-electric-conversion equipment drawing 8, 10 shows a photodiode as a whole, prepares mirror plane field 11A in an optical passage field part among the transparency packages 11, and has the same configuration for ** except for things. That is, mirror plane field 11A is formed in a part for an opposed face part with the photo detector 2 which affects light-receiving sensibility most among the front faces of the transparency package 11, and it has the same configuration except for being referred to as crepe field 11B into other parts.

[0016] Mirror plane field 11A is formed almost circularly here, and the aperture is set up according to the aperture of the laser beam which a photodiode 11 receives. Therefore, what is necessary is just to also set the aperture of mirror plane field 11A as the almost same magnitude as the aperture of spot light, if the spot light of a diameter 40 [about] [μm] is therefore received to a photodiode 11. Profile irregularity which sets to 0.06 [μm] profile irregularity incidentally permitted by mirror plane field 11A by the maximum difference of elevation, and is permitted by crepe field 11B is set to 6^{**2} [μm] by the maximum difference of elevation.

[0017] Even if the void by the turbulent flow of transparency resin, HIKE, a fault, etc. occur by this in the transparency package 11 of parts other than mirror plane field 11A, these are not recognized in the case of the fine sight inspection for being covered in respect of crepe. Consequently, it becomes unnecessary to undertake quality responsibility even to the part no functional Kaminoseki charge is [part] in light-receiving. Namely, what is necessary is just to inspect the void in the part (mirror plane field 11A) which appears direct-on light-receiving effect, HIKE, a fault, etc. It turns out that the photodiode which a fine sight inspection defect cannot produce easily from these can be obtained.

[0018] (1-2) Explain the manufacturing installation of a photodiode 10 which has the structure shown in a manufacturing installation, then drawing 1. The transparency resin sealing arrangement 15 shown in drawing 2 is used for manufacture of this photodiode

10. Therefore, this transparency resin sealing arrangement 15 becomes the shaping metal mold 16 and 17 of a pair, and the drive which moves this up and down. The inner skin of 16 and 17 of the shaping metal mold used in this example is formed in crepe in principle, and it is characterized by establishing the metal mold field by which mirror plane finishing was carried out in some shaping metal mold 16 which is punches.

[0019] Two or more crevices (the so-called cavity) are established in the plane of composition of the shaping metal mold 16 and 17 of a pair. Two or more photodiodes 10 are manufactured at once by arranging a photo detector in this cavity part at the time of manufacture, and pouring in transparency resin in a mold clamp meal and the condition of having been mold clamp carried out, from both sides. Each shaping metal mold 16 and 17 is constituted as follows, respectively. Therefore, the shaping metal mold 16 which is a punch first is constituted by attaching two kinds of pins (pin 16 for mirror plane field formation B, and frame ejection pin 16C) in body of metal mold 16A. Among these, pin 16B for mirror plane field formation is the metal mold components with which mirror plane finishing of the part exposed after attaching to body of metal mold 16A was carried out.

[0020] This pin 16B for mirror plane field formation is being fixed to the photo detector 2 by which the closure will be carried out within each cavity, and the location which counters. the installation condition has the few surface parts after installation to the inner skin of body of metal mold 16A, as shown in drawing 3 -- it is fixed so that it may *****. This amount of protrusions is 0 - about 1 [mum] extent. Therefore, a hollow part as shown at drawing 1 (B) will be formed in the front face of a photodiode 10 at this projected part.

[0021] On the other hand, frame ejection pin 16C is arranged among body of metal mold 16A in the both-sides location of each cavity. It is used for this frame ejection pin 16C projecting lead terminal 3B, and removing mold goods from the shaping metal mold 16 at the time of a mold aperture, as shown in drawing 4. Incidentally the end of frame ejection pin 16C is attached in ejection plate 19A arranged at the rear face of body of metal mold 16A through compression coil spring 18A. Moreover, it pulls to ejection plate 19A, spring 18B is attached, and it is made as [support / therefore / to this hauling spring 18B / body of metal mold 16A]. Therefore, if the shaping metal mold 16 is therefore lifted up at a piston 20, it is made as [project / body of metal mold 16A to frame ejection pin 16C].

[0022] On the other hand, body ejection pin 17B is attached in the cavity part of body of metal mold 17A at the shaping metal mold 16 and the shaping metal mold 17 of the female mold which makes a pair. Like frame ejection pin 16C explained previously, this body ejection pin 17B is attached in ejection plate 19B through compression coil spring 21A, and when the shaping metal mold 17 is therefore reduced by the piston 23 extended from a plinth 22 to the perpendicular upper part, it is made as [extrude / mold goods / project from body of metal mold 17A, and / from a mold face]. Incidentally, body of metal mold 17A of the shaping metal mold 17 and ejection plate 19B pull, and, therefore, are supported to spring 21B. Furthermore, this ejection plate 19B is supported on the plinth 22 through the compression coil spring 24.

[0023] In the above configuration, the shaping actuation by the transparency resin sealing arrangement 15 is explained. The photo detector 2 first attached upward on die pad 3A is arranged at the cavity **** mid gear of the shaping metal mold 16 and 17. The

transparence resin sealing arrangement 15 drives pistons 20 and 23 to a lower part and the upper part in this condition, respectively, and it carries out [mold clamp] of the shaping metal mold 17 of the shaping metal mold 16 and female mold of a punch mutually. Then, transparence resin is poured in into a cavity and the processing which therefore closes a photo detector to transparence resin is started.

[0024] After this processing is completed, the transparence resin sealing arrangement 15 drives pistons 20 and 23 to the reverse sense with the mold clamp time, and carries out the mold aperture of the shaping metal mold 16 and 17. In connection with this, the repulsive force by compression coil springs 18A and 21A begins to act on frame ejection pin 16C and body ejection pin 17B, and the force begins to act in the direction which removes a photodiode 10 from a mold face. The adhesion of the front face of mold goods and a mold face is comparatively small by forming in crepe the front face in the cavity prepared in the shaping metal mold 16 and 17 at this time except for the part of lock-pin 16C. Therefore, the photodiode 10 which is mold goods is simply picked out from metal mold. Therefore, the photodiode 10 with which the transparence package 11 was finished only for the opposite part of a photo detector 2 in the mirror plane is obtained by this eye mold clamp and mold aperture actuation. [a series of]

[0025] According to the above configuration, mirror plane field 11A can be prepared in some shaping metal mold 16 which is the field sides through which light passes among the shaping metal mold 16 and 17 of a pair, and other fields can reduce much more poor die releasing at the time of removing the mold goods therefore fabricated by mold clamp actuation of the shaping metal mold 16 and 17 of these pairs from the shaping metal mold 16 and 17 as compared with the former by considering as crepe. Moreover, except for a light-receiving side, other field parts are formed in a crepe side for the photodiode 10 manufactured using this shaping metal mold 16 and 17. It can avoid checking from the outside HIKE which this produced among transparence resin packages in addition to the light-receiving field, and fear of the defective judging which considered HIKE of these fields as the cause can be reduced much more. Consequently, the yield can be raised.

[0026] Furthermore, when it is only the part of pin 16B for mirror plane field formation which is inserted in body of metal mold 16A, and is fixed that most is a crepe side and is a mirror plane among mold faces, as for this shaping metal mold 16 and 17, the manufacturing cost of the shaping metal mold 16 and 17 can also be reduced much more. When mirror plane precision does not fulfill the predetermined value of standard at this time, the working hours which repair of the transparence resin sealing arrangement 15 takes can also be shortened much more that what is necessary is to remove only pin 16B for mirror plane field formation from body of metal mold 16A, and just to exchange for new pin 16B for mirror plane field formation.

[0027] (2) In other examples, in addition above-mentioned examples, although the case where the photodiode 10 which is therefore a photo detector was manufactured was stated to the transparence resin sealing arrangement 15, this invention can be widely applied, when closing not only this but a light emitting device, and other optoelectric transducers by transparence resin. Also in this case, only the part of an optical passage field is processed in the shape of a mirror plane, and other field parts can acquire the same effectiveness, if it forms in a crepe side.

[0028] Moreover, in an above-mentioned example, although the case where the field part which light passes among transparence resin packages was formed so that it may become

flat was described, this invention may really form convex lens 25A as shows not only this but the field part concerned to drawing 5 with shaping. If it does in this way, photo-electric-conversion equipment with condensing higher effectiveness can be obtained. In this case, what is necessary is just to use the pin 25 for mirror plane field formation by which the mold face curved in the concave surface configuration as shown in drawing 6. What is necessary is just to have carried out mirror plane finishing of the part of a mold face incidentally also in the case of this pin 25 for mirror plane field formation.

[0029] Although the case where it was used in the condition [that the optoelectric transducer and the field which counters have become depressed as compared with other field parts] was described as shown in drawing 1 (B), the resin 26 containing a pigment may be made, as for this invention, to adhere to this hollow part in a further above-mentioned example, as shown not only in this but in drawing 7. If it does in this way, the photo-electric-conversion equipment with a filtering function with which only the light of specific wavelength can pass this field can be obtained.

[0030] Moreover, if the resin 26 containing a pigment is made to adhere to a hollow part in this way and photo-electric-conversion equipment is formed, distance from the front face of an optoelectric transducer to a package front face can be shortened, and the part and the transparency effectiveness of light can be raised much more. And the package reinforcement of photo-electric-conversion equipment of the perimeter of an optoelectric transducer is also high by transparency resin being maintainable in the condition of a ** [which is kept thick] as.

[0031] In a further above-mentioned example, although the case where pin 16B for mirror plane field formation by which mirror plane finishing of the mold face was carried out was fixed to body of metal mold 16A was described, this invention may be attached free [not only this but sliding], and may be used as a body ejection pin.

[0032] [Effect of the Invention] According to this invention, at the time of manufacture of the photo-electric-conversion equipment with which the closure of the optoelectric transducer is therefore carried out to transparency resin as mentioned above as shaping metal mold By using the 1st shaping metal mold of mold face crepe which the metal mold components by which mirror plane finishing was carried out attached, and the 2nd shaping metal mold of mold face crepe for the mold face part which will meet an optoelectric transducer only an optoelectric transducer and the surface part which counters can be formed in a mirror plane, and forming in crepe cuts other surface parts. Consequently, the adhesion of a mold face and mold goods can be fallen and poor die releasing at the time of manufacture can be lessened. Moreover, since it is covered by crepe and is not visible from the outside even if HIKE etc. arises into parts other than an optical passage field among transparency packages, fine sight inspection can be prevented from therefore judging with a defective. Thereby, the yield can be raised much more.

[0033] Moreover, according to this invention, photo-electric-conversion equipment with condensing high effectiveness can be easily obtained as mentioned above by forming the convex lens with which the front face was formed in the mirror plane at the optoelectric transducer and the part which counters in coincidence. According to this invention, as compared with the former, thin photo-electric-conversion equipment with a light filter can be easily obtained by preparing the light filter which makes the hollow part of the

transparence package formed in an optoelectric transducer and the part which counters penetrate only the light of a predetermined band still as mentioned above.

PRIOR ART

[Description of the Prior Art] Optoelectric transducers, such as light emitting diode and a photodiode, are used in many fields including the optical pickup section today. For example, it is used also as the light source for automatic focuses, or an exposure meter of a camera. These optoelectric transducers are contained in the package of various quality of the materials or a configuration according to the application. Transparency resin is in one of the package ingredients of these. The photodiode for optical pickups described previously is one of the optoelectric transducers which use transparency resin as a package ingredient. The structure of this kind of photodiode 1 is shown in drawing 8.

[0004] The photo detector 2 which is the light sensing portion of this photodiode 1 is pasted up through the conductive epoxy resin on die pad 3A. Bonding pad 2A formed in the top face of a photo detector 2 is electrically connected through lead terminal 3B and the gold streak 4 which have been arranged around die pad 3A, respectively. It is the photodiode 1 which therefore closed this in the transparence package 5 which becomes with transparence plastic resin (an acid-anhydride system or phenol system).

[0005]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the approximate line-perspective view showing one example of the photo-electric-conversion equipment by this invention.

[Drawing 2] It is the approximate cross-sectional view of the transparence resin sealing arrangement used for manufacture of photo-electric-conversion equipment.

[Drawing 3] It is the approximate cross-sectional view showing the cross-section configuration and installation condition of a lock-pin.

[Drawing 4] It is the approximate cross-sectional view showing the mold omission condition of the shaping components by the ejection pin.

[Drawing 5] It is the approximate cross-sectional view showing the photo-electric-conversion equipment which has the lens section to an optical passage field.

[Drawing 6] It is the approximate cross-sectional view showing the cross-section configuration and installation condition of the pin for mirror plane field formation used for manufacture of the photo-electric-conversion equipment which has the lens section.

[Drawing 7] It is the approximate cross-sectional view showing the photo-electric-conversion equipment which has a light filter.

[Drawing 8] It is the approximate cross-sectional view showing the photo-electric-conversion equipment used conventionally.

[Description of Notations]

1 10 A photodiode, 2 .. A photo detector, 2A .. Bonding pad, 3A [.. Transparency

package,] A die pad, 3B .. A lead terminal, 4 .. 5 A gold streak, 11 11A A mirror plane field, 11B .. A crepe field, 15 .. Transparency résin sealing arrangement, 16 17 Shaping metal mold, 16A, 17A .. The body of metal mold, 16B, 25 .. The pin for mirror plane field formation, 16C A leadframe ejection pin, 17B .. Body ejection pin, 18A, 21A, 24 [.. A piston 22 / .. A plinth 25A / .. A convex lens 26 / .. Resin containing a pigment.] A compression coil spring, 18B, 21B .. A hauling spring, 19A, 19B .. 20 An ejection plate, 23

DRAWINGS

[Drawing 1]

[Drawing 3]

[Drawing 4]

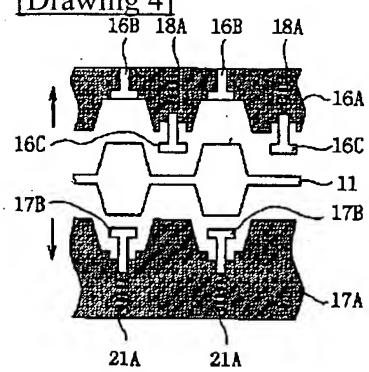


図4 型開き状態

[Drawing 5]

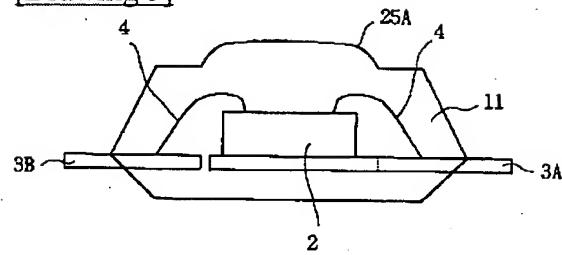


図5 他の実施例(1)

[Drawing 6]

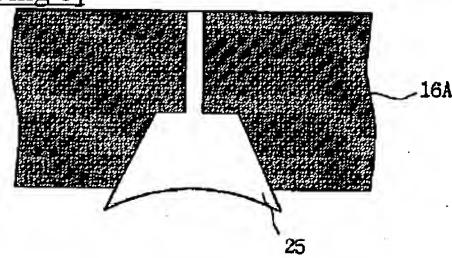


図6 凸レンズ形成に用いる鏡面領域形成用ピン

[Drawing 2]

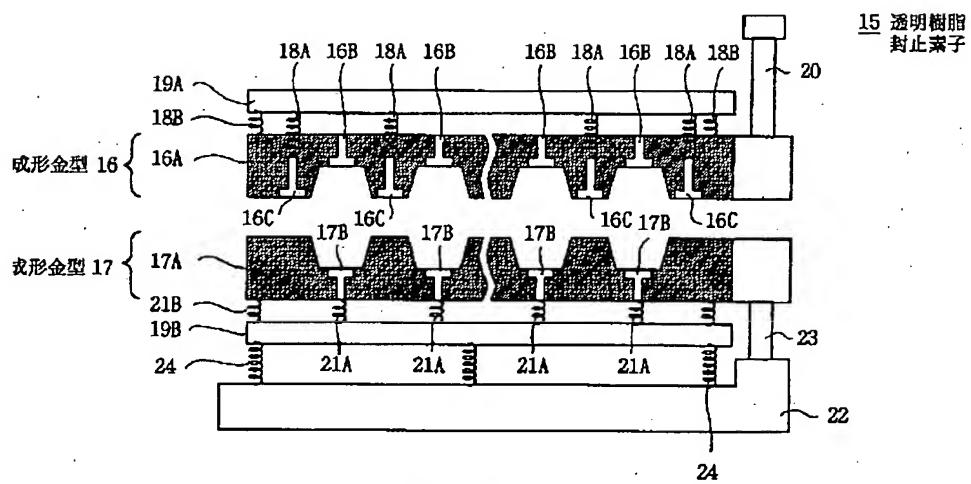


図2 透明樹脂封止装置

[Drawing 7]

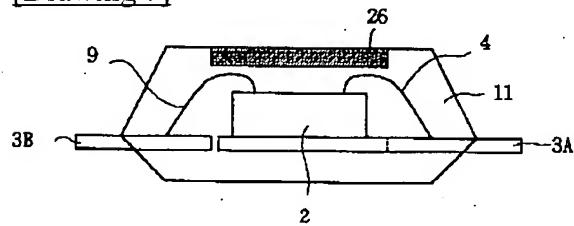
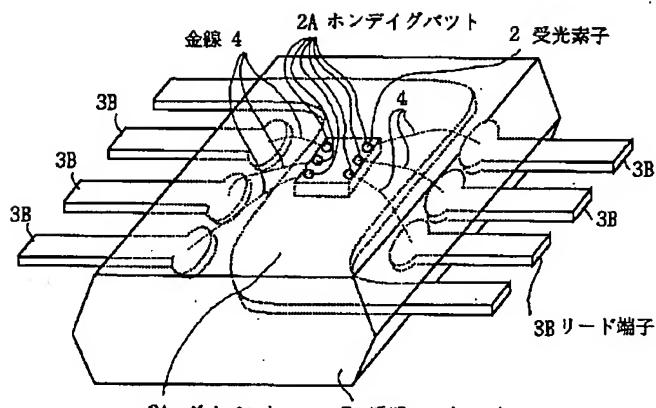
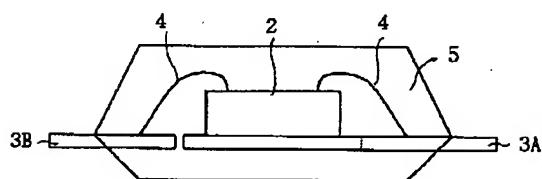


図7 他の実施例（2）

[Drawing 8]
1 フォトダイオード



(A)



(B)

図8 従来用いられている透明樹脂封止型フォトダイオード